The claims have been amended to remove multiple dependencies and to place the claims in a format more consistent with U.S. patent practice. No substantive amendments have been made to the claims, and the scope of the claims was not altered. Accordingly, no new matter has been added by way of these claim amendments.

The application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,

John Kilyk, Jr., Reg. No. 30,763
One of the Attorneys for Applicant(s)
LEYDIG, VOIT & MAYER, LTD.
Two Prudential Plaza, Suite 4900
180 North Stetson
Chicago, Illinois 60601-6780
(312) 616-5600 (telephone)
(312) 616-5700 (facsimile)

Date: November 8, 2001

CERTIFICATE OF MAILING

I hereby certify that this PRELIMINARY AMENDMENT (along with any documents referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, Washington, D.C. 20231.

Date: November 8, 2001

PATENT
Attorney Docket No. 212865

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Kurita et al.

Application No. 09/921,358

Art Unit: Unassigned

Examiner: Unassigned

Filed: August 2, 2001

For: FLEXIBLE METAL-CLAD LAMINATE AND PROCESS FOR PREPARING THE SAME

PENDING CLAIMS AFTER ENTRY OF PRELIMINARY AMENDMENT

1. A flexible metal-clad laminate comprising a metal foil and a heat-resistant resin film layer formed on one side of the metal foil, the heat-resistant resin film layer comprising a crosslinked condensation polymer and having an N-methyl-2-pyrrolidone-insolule content of at least 1%, particularly 1 to 99%.

2. The flexible metal-clad laminate according to claim 1, wherein the heat resistant resin film layer is formed by converting an organic solvent-soluble condensation polymer by crosslinking into an organic solvent-insoluble form.

3. The flexible metal-clad laminate according to claim 1, wherein the heat-resistant resin film layer is formed by applying to the metal foil a solution prepared by dissolving an organic solvent-soluble condensation polymer in the organic solvent and subjecting the coated metal foil to a predrying step, and a heat-treatment and solvent removal step.

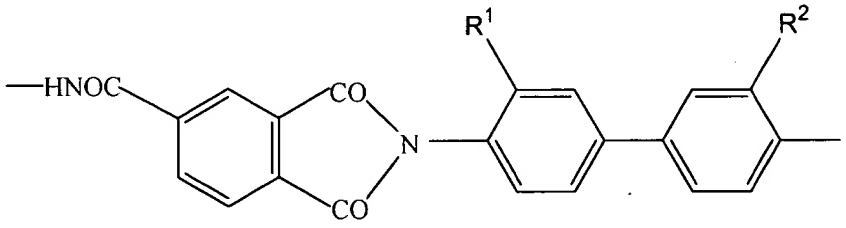
4. The flexible metal-clad laminate according to claim 1, wherein the heat-resistant resin film layer has an initiation tear strength (film thickness: 20 μm) of at least 15 kg and has a thermal gradient dimensional change of not more than 0.1% when heated at 200°C for 30 minutes.

5. The flexible metal-clad laminate according to claim 1, which has a solder heat resistance of at least 350°C, an adhesion between the metal foil and the heat-resistant resin film of at least 80 g/mm and a radius of curvature of at least 15 cm.

6. The flexible metal-clad laminate according to claim 1, wherein the average surface roughness Ra of the surface of the heat-resistant resin film layer which is in contact with the metal foil is not more than 0.4 μm.

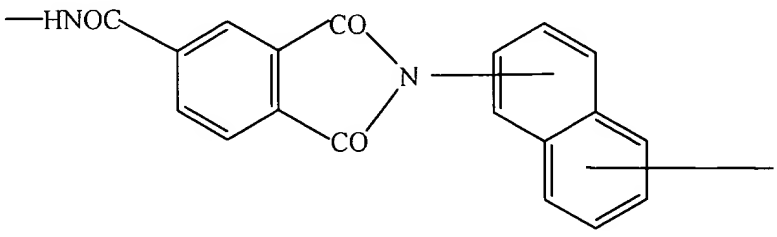
7. The flexible metal-clad laminate according to claim 1, wherein the elastic modulus retentivity of the heat-resistant resin film after being immersed in an aqueous solution of sodium hydroxide (40% by weight) at 25°C for 100 hours is at least 40%.

8. The flexible metal-clad laminate according to claim 1, wherein the condensation polymer comprises the unit represented by formula (1)



(1)

wherein R^1 and R^2 are the same or different and each represents hydrogen or an alkyl or alkoxy group having 1 to 4 carbons atoms and/or the unit represented by formula (2)



(2)

9. A method for producing the flexible metal-clad laminate as set forth in claim 1, the method comprising the steps of

(A) applying to the metal foil a solution prepared by dissolving a heat-resistant resin containing an organic solvent-soluble condensation polymer in the organic solvent, predrying the resulting coating film until the coating has a residual solvent content of 10 to 40% by weight to obtain a predried laminate comprising the predried heat-resistant resin layer and the metal foil, and

(C) heat-treating the above predried laminate.

10. The method according to claim 9, which further comprises step (B) of winding up, in the form of a roll, the predried laminate obtained in step (A) in such a manner that its coated surface does not come into contact with its uncoated surface.

11. The method according to claim 9, wherein the predrying in step (A) is carried out at a temperature 70°C to 130°C lower than the boiling point of the solvent used for preparing the heat-resistant resin solution.

12. The method according to claim 9, wherein the heat-treating in step (C) is carried out under reduced pressure and/or in an inert gas atmosphere, while removing the solvent such that the heat-resistant resin layer has an insoluble content of 1% to 99%.

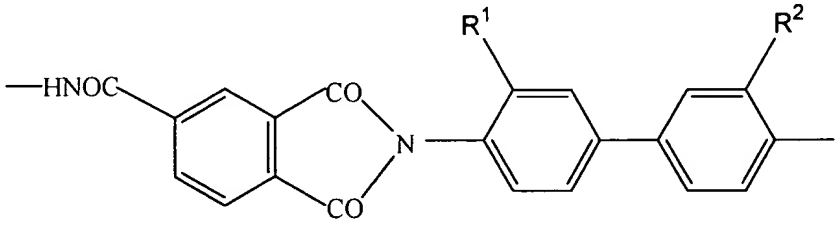
13. The method according to claim 9, wherein in step (C), the predried laminate is dried under reduced pressure at 200 to 400°C to reduce the residual solvent content to 5% by weight or lower and then heating the laminate in an inert gas at 200 to 400°C for 1 to 30 hours.

14. The method according to claim 10, wherein step (A) comprises applying the heat-resistant resin solution to the metal foil to leave the lengthwise borders on either edge uncoated, predrying the applied resin solution to obtain a predried laminate comprising the predried heat-resistant resin layer and the metal foil and step (B) comprises placing a tape made of a material different from that of the laminate on the uncoated portions of the predried

laminate or covering both lengthwise edges of the predried laminate with the tape, when winding up the metal foil.

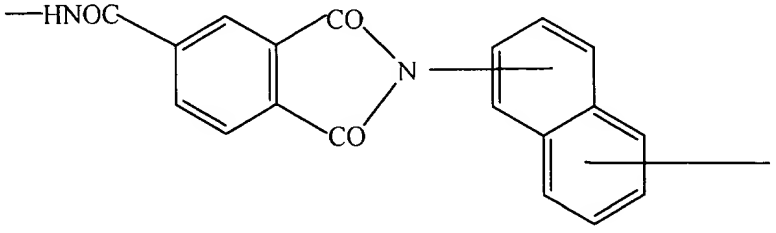
15. The method according to claim 9, wherein the heat-resistant resin is an organic solvent-soluble polyimide and/or polyamide-imide.

16. The method according to claim 9, wherein the heat-resistant resin comprises the unit represented by formula (1)



(1)

wherein R^1 and R^2 are the same or different and each represents hydrogen or an alkyl or alkoxy group having 1 to 4 carbon atoms and/or the unit represented by formula (2)



(2)

17. A flexible metal-clad laminate which is produced by the method according to claim 9.

18. A flexible printed wiring board which is obtainable from the flexible metal-clad laminate according to claim 1.

PATENT
Attorney Docket No. 212865

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Kurita et al.

Art Unit: Unassigned

Application No. 09/921,358

Examiner: Unassigned

Filed: August 2, 2001

For: FLEXIBLE METAL-CLAD LAMINATE AND PROCESS FOR PREPARING THE SAME

AMENDMENTS TO SPECIFICATION AND CLAIMS MADE VIA PRELIMINARY AMENDMENT

(Deletions to the specification are indicated by brackets, while additions are indicated by underlined text)

IN THE SPECIFICATION:

Amendments to the paragraph beginning at page 17, line 10:

In the preparation of aromatic polyimide and aromatic polyamide-imide for use in the present invention, other substances may be used insofar as heat resistance and coefficient of thermal expansion are not deteriorated. Such other substances include acid components such as adipic acid, azelaic acid, sebacic acid, [cyclohexane-4,4,'-dicarboxylic] cyclohexane-4,4'-dicarboxylic acid, butane-1,2,4-tricarboxylic acid, butane-1,2,3,4-tetracarboxylic acid, cyclopentane-1,2,3,4-tetracarboxylic acid and like aliphatic and alicyclic dicarboxylic acids, polycarboxylic acids and monoanhydrides, dianhydrides and esterified compounds of these substances; amine components such as tetramethylenediamine, hexamethylenediamine, isophorone diamine, 4,4'-dicyclohexylmethanediamine, cyclohexane-1,4-diamine, diaminosiloxane and like aliphatic and alicyclic diamines and diisocyanates corresponding to these substances. The aliphatic and alicyclic diamines and diisocyanates may be used singly or as mixtures of two or more species. Resins prepared by combining and polymerizing any of these acid components and amine components may also be used as blended.

Amendments to the paragraph beginning at page 31, line 22:

The flexible metal-clad laminate of the present invention is characterized in that it is produced by laminating (e.g., by applying a solution containing an organic solvent and a condensation polymer to a metal foil and drying the laminate) the metal foil 11 and the heat-resistant resin film 31 comprising an organic solvent-soluble condensation polymer and formed on one side of the metal foil. The flexible metal-clad laminate is also characterized in that the heat-resistant resin film [11] 31 contains the above crosslinked condensation polymer and that the heat-resistant resin film has an N-methyl-2-pyrrolidone-insolule content of at least 1% after being laminated.

IN THE CLAIMS:

6. (Amended) The flexible metal-clad laminate according to claim 1, wherein the average surface roughness Ra of the surface of the heat-resistant resin film layer which is in contact with the metal foil is not more than 0.4 μm.

17. (Amended) A flexible metal-clad laminate which is produced by the method according to [any one of claims] claim 9 [to 16].

18. (Amended) A flexible printed wiring board which is obtainable from the flexible metal-clad laminate according to [any one of claims] claim 1 [to 8].